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11.03.92 Bulletin 92/11(71) Applicant: **SUMITOMO ELECTRIC INDUSTRIES, LTD.**
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W-8948 Mindelheim(DE)(54) **Aluminum nitride powder, sintered body and production thereof.**

(57) The present invention provides an aluminum nitride powder comprising (i) aluminum nitride as a main component and (ii) at least one metal element selected from the group consisting of Ti, Zr, Hf, V, Nb, Ta, Cr, Mo, W, Mn, Fe, Co, Ni, Nd and Ho and/or one or more compounds thereof in the total amount of 0.1 to 3.0% by weight as metal based on the weight of AlN. Such an aluminum nitride powder is useful for the preparation of colored sintered bodies having a thermal conductivity of at least 130 W/m.K, and a flexural strength of at least 30 kg/mm² and a high density, substrates for circuit boards and packages for semiconductor devices. The sintered body further contains, as a sintering aid, at least one selected from Groups IIa and IIIa elements of the

Periodic Table and compounds thereof in the total amounts of 0.01 to 5.0% by weight (as metal) based on the weight of AlN.

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 5)
X	EP-A-0 342 595 (SUMITOMO ELECTRIC IND LTD) * the whole document *	1,2,4,8 ,10	C 04 B 35/58
Y	---	3	
Y	IEEE PROCEEDINGS OF THE ELECTRONIC COMPONENTS CONFERENCE 1989, New York, US; C. JIDUO et al.: "Research on Manufacturing Aluminium Nitride Powder by Reduction" * pages 913-919 *	3	
X	EP-A-0 321 975 (ELEKTROSCHMELZWERK KEMPTEN) * page 5, line 46 - page 7, line 27; claims 1-4 *	1,4-7	
X	CHEMICAL ABSTRACTS vol. 110, no. 8, 17 April 1989, page 324, abstract no. 140353g, Columbus, Ohio, US; & JP - A - 63242972 (TOSHIBA CORP) 07.10.1988 * abstract *	1,4,6	
	---		TECHNICAL FIELDS SEARCHED (Int. Cl. 5)
X	CHEMICAL ABSTRACTS vol. 109, no. 4, 25 July 1988, page 238, abstract no. 26704b, Columbus, Ohio, US; & JP - A - 63060167 (IBIDEN CO LTD) 16.03.1988 * abstract *	1,2,4,5	C 04 B
X	US-A-4 877 760 (A. OKUNO et al.) * the whole document *	1,4,8, 10	
X	EP-A-0 114 193 (W.C. HERAEUS GMBH) * claims 1-5 *	1,4,5,8 -11	
	---	-/-	
The present search report has been drawn up for all claims			
Place of search BERLIN		Date of completion of the search 05-12-1991	Examiner KUEHNE H C
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	



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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	EP-A-0 371 315 (PATENT-TREUHAND-GESELLSCHAFT FÜR ELEKTRISCHE GLÜHLAMPEN MBH) * claims 5,6 * ---	4,5	
X	CHEMICAL ABSTRACTS vol. 109, no. 8, August 1988, page 347, abstract no. 60166n, Columbus, Ohio, US; & BR - A - 8603285 (CERAMICA E VELAS DE IGNICAO NGK) 15.03.1988 * abstract * ---	1,4,8- 10	
X	CHEMICAL ABSTRACTS vol. 110, no. 29, May 1989, page 331, abstract no. 198032t, Columbus, Ohio, US; & JP - A - 63277565 (TOSHIBA CORP) 15.11.1988 * abstract * ---	1,2,4,6	
X	CHEMICAL ABSTRACTS vol. 109, no. 22, November 1988, page 369, abstract no. 195983x, Columbus, Ohio, US; & JP - A - 63162576 (NARUMI CHINA CORP) 06.07.1988 * abstract * ---	1,4,8, 10	
A	CHEMICAL ABSTRACTS vol. 109, no. 20, 29 November 1988, page 308, abstract no. 175293u, Columbus, Ohio, US; & JP - A - 63156007 (DENKI KAGAKU KOGYO) 29.06.1988 * abstract * -----	1	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
Place of search BERLIN		Date of completion of the search 05-12-1991	Examiner KUEHNE H C
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